




Plug-in Device Study
B90 Occupant Informational Meeting

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27 July 2010

BERKELEY LAB

http://plug-in.lbl.gov

Plan

- Why do this study?
- Study protocol
- Questions & discussion

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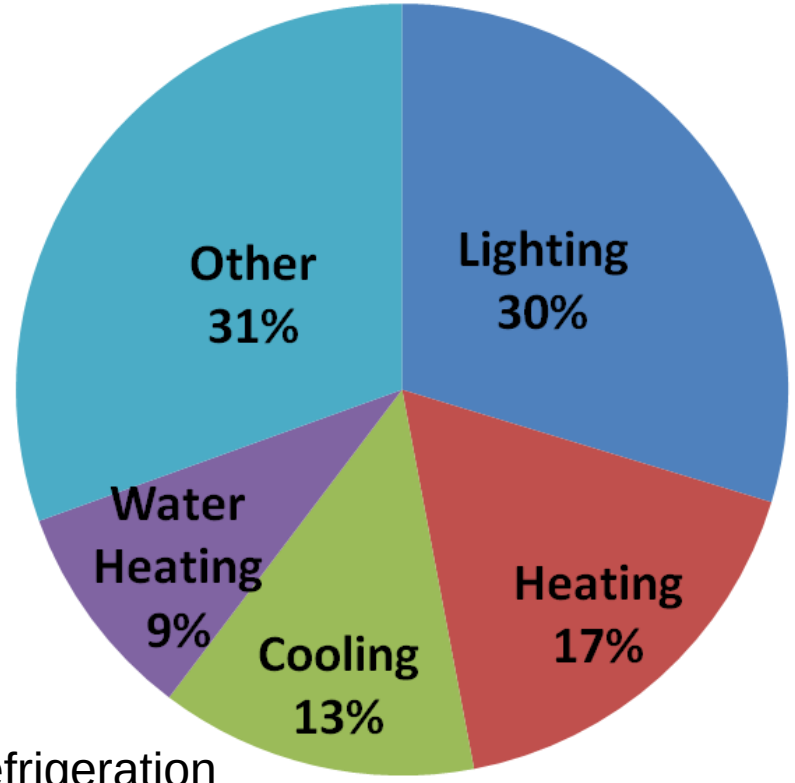
Commercial Building Energy Use

- Commercial buildings use 20% of US energy*
- 1/3 of energy goes to “other” devices (2010 est)
  - Least understood category
  - Fastest growing
- “Other” devices are largely plug-in devices



*Primary energy from fuel
Other includes electronics, computers, cooking, refrigeration
2009 DOE Buildings Energy Data Book, http://buildingsdatabook.eren.doe.gov

Reducing “Other” Energy Use

- DOE needs to understand problem better
  - HVAC and lighting becoming very efficient
  - Net zero energy buildings need to deal with plug-ins
- Current strategies have large uncertainties
- Reversing the growth
  - Requires data on consumption and usage
  - Influence future designs based on data
  - Feedback into Energy Star and other policy outlets

Related Projects

- Residential study: develop methods for houses
  - Potential participants submitted screening survey
  - Currently selecting homes for study
- Bay Area Hospital
  - Spot metering of medical equipment
  - Metering during medical staff training exercises
- DOE funded similar projects at other labs
  - Metering at JC Penny, Walmart, McDonalds, PNNL buildings, a Church, and ORNL buildings

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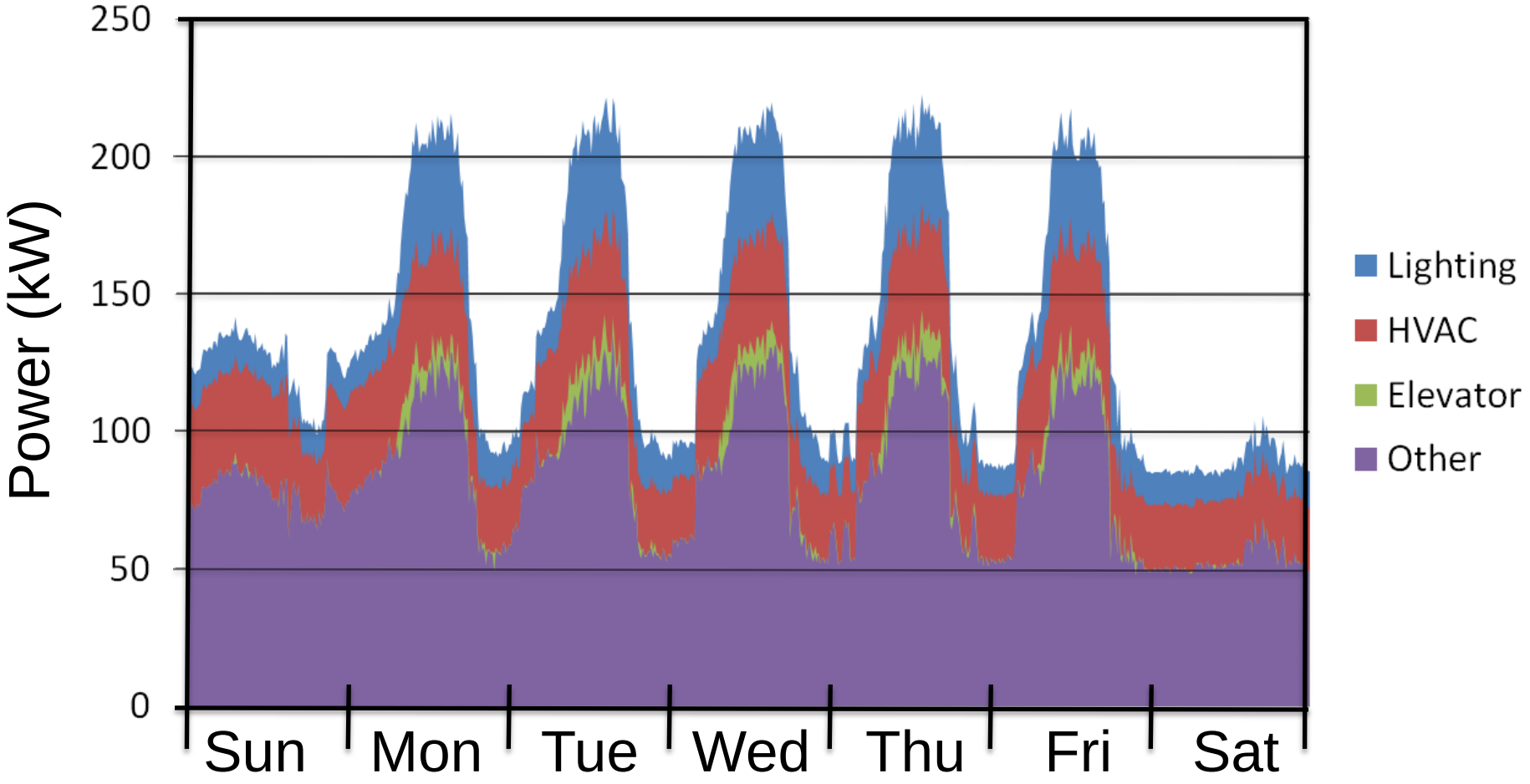
B90 Electricity Use



Other: Max 75% Avg 60% Min 40%

B90 Plug-in Devices

- B90 is a 90,000 sq ft building
  - Home to about 400 people
  - Who use about 4000 plug-in devices
- Device types found in B90
  - Computers, monitors, laptops
  - Fridges, microwaves, toasters
  - Printers, copiers
  - Task lights
  - Network equipment, servers
  - And lots more

Study Goal

Develop a method for characterizing plug-in device energy use in commercial buildings

- The types and numbers of devices
- Their energy use patterns
- The required data collection parameters
- Data analysis techniques

Plan

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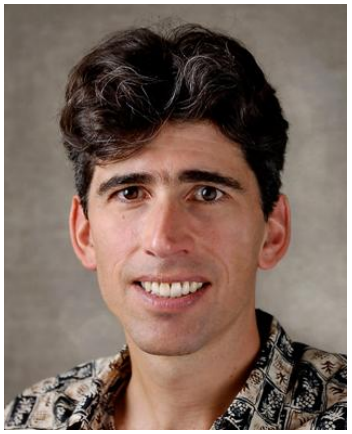
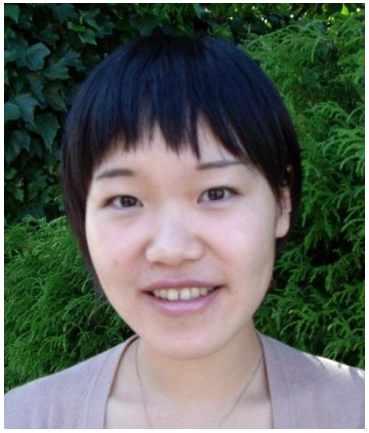
Study Team



Rich Brown

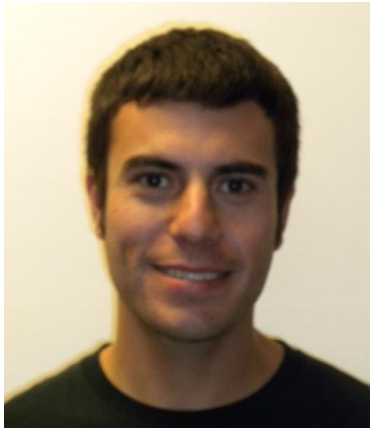
Alan Meier

Steven Lanzisera

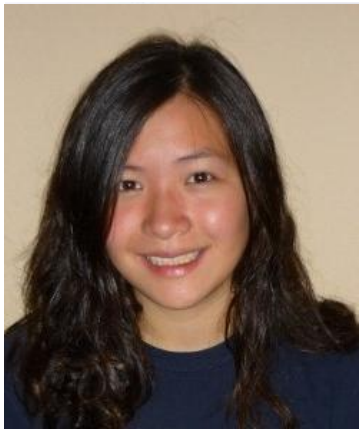


Iris Cheung

Judy Lai



Nik Goodell



Jessica Chang

Kyle Marini

Study Protocol

1. Inventory plug-in devices in B90
2. Select sample of devices from the inventory
3. Install plug-in device electricity meters
4. Measure electricity use for 6 months
5. Remove meters at end of study

Inventory

- Researchers will record the number and type of devices by office number in B90
  - Written, dictated audio file, or typed into a computer
- Inventory primarily after hours
  - Minimize disruption
  - You can elect to have someone present
  - http://plug-in.lbl.gov Click on “Requests”
  - We’ll try not to disturb your work space
- You will be notified by postings

B90 Research on Plug-in Devices: Inventory

As part of a research study on plug-in devices in the workplace, beginning June 29, 2010 researchers will conduct an inventory of plug-in devices in B90.
In order to minimize workplace disruption, researchers will walk through the building after normal working hours and record the types and locations of plug-in devices. If you would prefer to be present during the inventory of your workspace, we would be happy to accommodate your request. Please visit http://plug-in.lbl.gov and select the "Requests" tab. The study team will inventory the spaces below after 5pm on the dates listed.

90-1121 through 90-1129
June 29 - 30, 2010

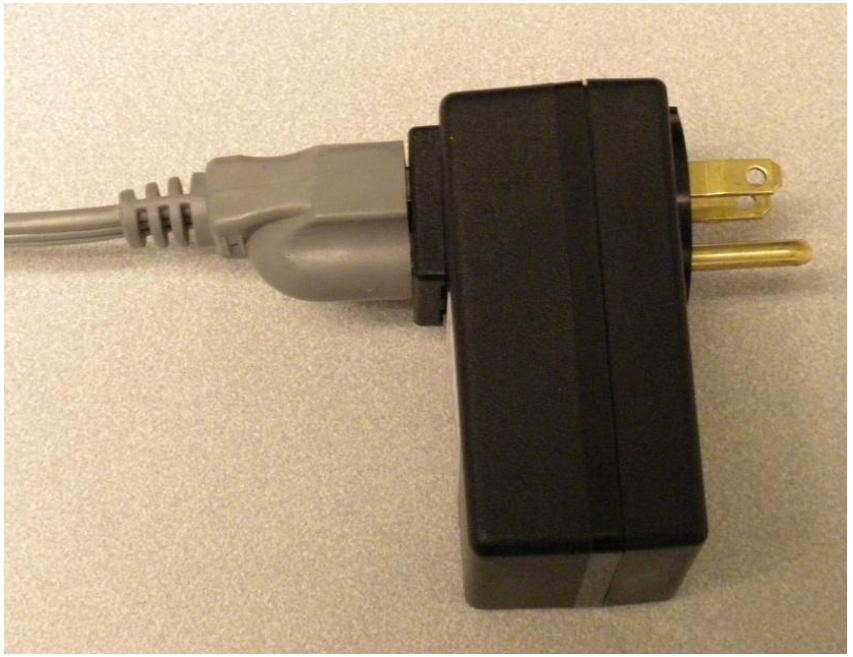
For more information visit plug-in.lbl.gov, or contact Steven Lanzisera at SMLanzisera@lbl.gov.

Escorted Inventory

- You can request to escort our staff during the inventory of any space
- Use the “Requests” tab on the web
  - We’ll contact you to setup a convenient time

The Meters

- Wirelessly transmits energy data every 10s
- Consume 0.4W
- Accurate to better than 1W or 5%



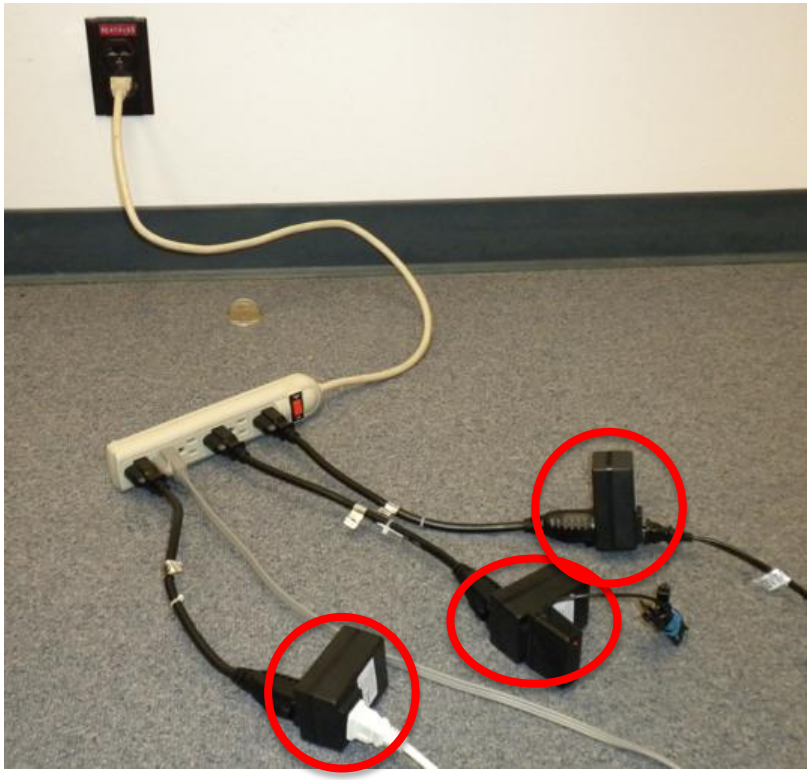
The Meters


BERKELEY LAB
MAXIMUM RATING:
125V AC
15A MAX
Meter ID: 1123
Info: http://plug-in.lbl.gov
Issues: plug-in@lists.lbl.gov
Major issues: 510-486-7201

Meter Installation Procedure

- If a device in your area is selected for metering
  - We'll leave a request to meter in your workspace
  - Please read, mark your preference, and sign
- You can be present for the meter install
  - Mark the corresponding box on the form
- Please shut down sensitive devices before install

Meter Installation



Building 90 Plug-In Device Metering Consent Form

In June 2010, a DOE-sponsored research study began in Building 90 on the energy use of plug-in devices (also known as Miscellaneous and Electronic Loads -- MELs), and will take place until January 2011. The purpose of this research is to collect data on energy used by plug-in devices in the workplace. Steven Lanzisera (EETD) will lead the field work, and Rich Brown (EETD) and Alan Meier (EETD) are the PIs. Researchers recently inventoried plug-in devices in Building 90 and approximately 500 devices have been randomly selected from the inventory for metering.

Scheduled date for meter installation: July 30, 2010

The device(s) below has been randomly selected for metering; please place an X in one of the gray boxes below for each listed device:

Location: 90-1121D

Device:	Metering Approved*	Metering Approved* Request to be Present During Installation and Removal	Decline to Participate
Computer, Laptop, Lenovo	X	X	X
Display, Computer, LCD	X	X	X

*** An X in these columns indicates that you volunteer to participate.**

Please note that your participation in the metering is voluntary. You can request to be present during meter installation/removal by checking the above box. You may decline participation by checking the appropriate box above. At any time during the study, you are free to withdraw by clicking on the "Requests" tab at plug-in.lbl.gov and submitting the web form to discontinue metering. We will contact you promptly to arrange meter removal. No penalty will occur as a result of not participating or withdrawing from the study.

AUTHORIZATION I have read this consent form. All of the questions I asked have been answered to my satisfaction. I volunteer to participate in this research.

Date _____ Subject's Signature _____

_____

Subject's Name (print legibly)

Please leave this signed form in an obvious location for the research team to collect!

Note: additional information is provided on reverse of this sheet.

Ernest Orlando Lawrence Berkeley National Laboratory
One Cyclotron Road | Berkeley, California 94720 | Tel: 510.486.5001 | Fax: 510.486.7290

Continue Using Your Devices Normally

- Try not to change your behavior as a result of the meter
- If you unplug something from a meter, try to plug it back into the same meter next time
- The meter will not affect the performance of your device
- If you suspect a problem with the meter (rare), contact us

Meter Removal

- We'll post notices for meter removal
- You can request to be present
  - On the consent form
  - By filling out the form on the requests tab

Privacy

- Meter ID and location are linked
- This link **will not** be shared outside study team
- Link information will be destroyed after study
- Names are not collected

Post study:

Space type (office, cube, etc), device type, and energy use data will be public.

Office number will not be available

Study Schedule

- Inventory:
  - Starts 29 July in EETD
  - Runs through middle of August
- Meter install:
  - Late July through end of September
- Metering:
  - July through March
- Removal:
  - March and April






Discussion & Questions

http://plug-in.lbl.gov

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